

Internship Proposition
(one page max)

Master 2 GP Immunology & ImmunIntervention (I³)
2025-2026



Lab: CR2TI

Team: Roquilly/Poschmann

Name and position of the supervisor: Aurélien Sérandour, maître de conférences

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Candidate (if internship filled): non

Title of the internship: Deciphering the Molecular Control of Silent vs Inflammatory Phagocytosis in Alveolar Macrophages

Summary of the internship proposal:

Alveolar macrophages (AMs) are pivotal sentinels of lung immunity, capable of clearing pathogens without provoking harmful inflammation. This “silent phagocytosis” preserves pulmonary integrity, whereas in certain contexts, such as bacterial infections, AMs switch to an inflammatory response characterized by cytokine release. The molecular mechanisms governing this functional dichotomy remain insufficiently understood. This project aims to identify genes that drive the polarization of AMs towards either a silent or inflammatory phagocytic state, using results from high-throughput CRISPR screening.

1. Gene Selection:

Prioritize top hits from the CRISPR screen: genes whose KO promotes inflammation and those promoting tolerance.

2. Generation of Knock-Out and Overexpression Lines using immortalised macrophages expressing Cas9 or dCas9-VP64.

3. Functional assays.

Make co-culture macrophages with *E. coli* expressing YFP.

Assess: cytokine secretion, phagocytic index, surface marker changes.

4. Transcriptomic Analysis:

Perform bulk RNA-seq or single-cell RNA-seq on selected KO and WT macrophages post-phagocytosis. Identify pathway alterations.

5. *In Vivo* Relevance (Optional):

Induce lung infection in KO mouse model to evaluate the physiological relevance

Option(s) linked to the project:

- ☐ Clinical Research Profile (Recherche Clinique)
- ☒ Data Analyst Profile (Recherche et Analyse de Données Omiques)
- ☒ Experimental Biology Profile (Recherche Expérimentale)

Form to be sent by email to : gpi3@univ-nantes.fr